

THERAPEUTIC MANAGEMENT OF SARCOPTIC MANGE IN GOAT: A COMPARATIVE STUDY ALLOPATHIC AND HERBAL PRODUCT

**BISWAJYOTI BORAH¹, NABA NAHARDEKA²,
DILIP KR. DEKA³, RUMI G. SARMA⁴ & ABDUS SALEQUE⁵**

¹AICRP on Goat Improvement, Goat Research Station, Assam Agricultural University, Burnihat, Assam, India

²Principal Investigator, AICRP on Goat Improvement, Goat Research Station, Burnihat,

Assam Agricultural University, Kamrup (M) Assam, India

³Principal Scientist, Goat Research Station, Burnihat, Assam Agricultural University,
Kamrup (M) Assam, India

⁴Research Associate, AICRP on Goat Improvement Goat Research Station, Burnihat,
Assam Agricultural University, Kamrup (M) Assam, India

⁵Chief Scientist, Goat Research Station, Burnihat, Assam Agricultural University, Kamrup (M) Assam, India

ABSTRACT

Sarcoptic mange, this 'skin disease' has remarkable economic importance that reduced the productive, reproductive and quality parameters of meat and hide in affected animal. The present experiment was conducted to evaluate the comparative efficacy of commercially available allopathic and some traditional medicinal value herbal products to find out a suitable therapeutic measure for treating this disease in goat. A total of 32 numbers of Assam Hill Goat (Assam local) and Black Bengal goat breeds, irrespective of age and of both sexes that had been identified based on skin scrapings of naturally occurring sarcoptic mange were enrolled. All cases were subjected to scoring of the relevant significant clinical signs of irritation with encrustation, loss of hairs and excoriation from rubbing and scratching. Study showed that the supportive treatment with topical application and injectable ivermectin injection has better result compare to herbal topical application with ivermectin injection. However the herbal products may also be useful in field application.

KEYWORDS: Therapeutic, Sarcoptic, Mange, Allopathic, Herbal

INTRODUCTION

Goatery is one of the growing, eco-friendly, subsidiary and need oriented farming components of Indian agricultural system. Often goat husbandry constitutes only the source of cash income in many rural areas of India (Vision 2030, 2011). The growth of this husbandry is often hampered by diseases. One of the important such diseases is sarcoptic mange.

Sarcoptic mange is highly contagious mite infection cause by *Sarcoptes scabiei*. This etiological agent believed to be originated as a human parasite and man spread the infection to domestic animals (Fain, 1978). Sarcoptic mange has been reported from 10 orders, 27 families and 104 species of domestic, free ranging and wild animals (Pence and Ueckermann 2002). This disease has a density dependent direct or indirect transmission pattern. *Sarcoptes scabiei* burrows into the skin at the level of the stratum germanativum. Part of burrowing accomplished the action of cutting mouthparts, chelicerae and

gnathosoma, and cutting hooks on the legs. Pathogenesis is attributed to mechanical disruption and ingestion of cells and tissue fluids by mites. This is followed by excretion and secretions of living mites resulting an irritation and allergic effect. Both type I and type IV hypersensitivity reaction has been observed in animals (Pence and Ueckermann 2002). The disease is more in young, stressed, malnourished, immune compromised and unkempt goats than that of adults (Nwoha 2011). In sarcoptic infection the main signs are irritation with encrustation, loss of hairs and excoriation from rubbing and scratching, in long standing cases the skin become thickened and nodule may developed on less well haired parts of the skin, including the muzzle, around eye, inside the ear. Kids born from affected does, are likely to suffer very easily than normal mother. The mite also transmissible to humans on close contact with infected animals (Bandi and Saikumar 2013). The incidence is very common irrespective of breed, sex, age. Transmission of occurs between mature animals and also from mother to offspring at birth. Infestation also occurs by indirect transfer. The length of time that *Sarcoptic spp.* survive off depends on environmental condition may be between two to three weeks, consequently, the animal bedding may become contaminated and is a possible source of infestation (Bandi and Saikumar 2013). This "Skin disease" has greatest economic importance, as it reduced the productive, reproductive and quality parameters of meat and hide in affected animal. Sometimes this Sarcoptic mange problem has made havoc in many district of North-Eastern part of India.

Since time immemorial some of the herbal compounds are being employed for treating skin diseases, some of them are *Neem* (*Azadirachta indica*), tobacco (*Nicotiana tabacum*) extract etc. *Neem*, a tree native to India also known as 'one tree pharmacy' is a vital ingredient in Ayurveda. *Neem* leaf has antifungal and antibacterial properties. It also relieves dryness and itching, strengthens hair and promotes hair growth. *Neem* extracts exhibits anti-inflammatory, antioxidants and detoxifying properties. Tobacco extract basically contain Nicotine, a nitrogen-containing chemical - an alkaloid, this specifically for the elimination of insects. It is extensively used as an insecticide. Both these compounds are being used in traditional medicine.

The present study was conducted to find out a cost effective, suitable sarcoptic mange control measure at the farmers field.

MATERIALS AND METHODS

Experiment Design

Present study was carried out by taking 32 (thirty two) numbers of severely saroptic mange affected Assam Hill Goat(Assam local), after confirming the physical appearance of mange as well as microscopic observation of parasite (*Sarcoptes scabiei var caprae.*) in the animals scrapping. Out of these thirty two numbers, 16 (sixteen) numbers were kids at the age group of 1.5 to 3 months. These thirty two animals were divided into four groups namely A, B, C, D, comprises of two adult males, two adult females, two male kids and two female kids.

Hosing Arrangement and Nutrition

Each groups were housed in four different houses with separate compartment irrespective of members and given the same plane of nutrition. The animal houses were regularly disinfected with phenol.

Parasitological Examination

Prior to enrollment in the study, the goats had to have existing *S. scabiei var caprae* infestation, as assessed by the determination of live mites (larva, nymph and adult) within skin scrapings of at least 2-3 sites. Scrapings were performed (on days 0, 15 and 45) at those sites adjunctive to healthy tissues, believed to be most likely to yield mites and to those of

visible suspected lesions. Hair was clipped thoroughly and then the lesion was scraped until capillary bleeding was evident. The obtained scraping material was mounted in paraffin liquid and microscopically examined for live mites, and when necessary the samples were cleared with potassium hydroxide. The data were recorded on the presence or absence of live mites.

Therapy Protocols

At the very first step, the animals were injected Neomac injection (Ivermectin, INTAS pharmaceuticals) at the rate of 0.2 mg per kg body weight on the very first day and this injection was repeated at seven days interval for three occasions by subcutaneous route (Taylor, et al., 2007) along with Avil vet injection (pheniraminemaleate, Intervet, SPAH) at the rate of 0.5 to 1ml per animal depending upon body size, intramuscularly on the same day. From the next day of the Neomac injection, orally liver supportive (Feroliv, Vetsfarma company) were given daily to all animals at the rate 10 to 15 ml depending upon body size as divided or single dose for fifteen days, and Vimeral liquid (Vitamin A, D3, E, and B12, Vibrac company) also fed to the animals at the rate of 5 ml daily per animal for fifteen days.

In group "A", all animals were washed with tikkil (Cymethrin, Indian Immunologics) at the rate of 1ml per liter of water at three days interval from the day of Neomac injection, for 6(six) occasions taking especial care during washing.

Group "B", all animals were washed with tobacco extract (*Nicotiana spp.*, prepared by 3 to 4 numbers of black colored tobacco leafs putting into one liter water for overnight, next day grind the leaf and preparing a solution after removal of the leaf and stems) at three days interval as that of the previous group for 6 (six) occasions .

For group "C", animals a solution of *Neem* extract (*Azadirachta indica*, solution was prepared by putting approximately 100 grams of *Neem* leaf into 1 liter of water and boiled for 20 to 30 minutes till brownish black colored come up) was used for washed, at three days interval as that of the previous two groups for 6 (six) occasions .

In case of group "D" animals no topical application was advocated.

Statistical Analysis

The data were subjected to evaluate using suitable software. Significance was evaluated with the differences among groups and results were deemed statistically significant if $P \leq 0.05$ or $P \leq 0.001$.

RESULTS

Scoring Results over the Study Period

After one month of the last washing, all animals were observed and results were as follows,

From the group "A" seven animals were completely recovered, out of which two females, one male, and all four kids. The remaining male animal showed much improve the conditions but could not be consider as completely recovered. (Figure 1 a, b, c)



Figure 1 a: A Female Animal before Treatment from Group A (Day 0)



Figure 1 b: Same Animal during Treatment (after 6th Washed)



Figure 1 c: Same Animal after Fifteen Days of the Last Washed

From the group “B” five animals were completely recovered, out of which two females, and three kids (two female kids, one male kid). Rest of the animal improves signs of recovery. The remaining animals were recovered after 2 to 3 of subsequent washing .

From the group “c” two animals were completely recovered, both were female kids. (The remaining animals were recovered after 4 to 5 of subsequent washing)

From the group “D” none of the animals were completely recovered after one month of the treatment, but all animals were in good condition then starting recovering.

The above result showed that the maximum recovery was found in group A, among the groups (87.5%) and female kids showed the highest recovery among the animals (31.25%) during the phase of study. When we try to find out the correlation among the group of female kid recovery and intended treatment, the results were showed positive correlation in all the groups. And results were found to be significant at $P \leq 0.001$.

Table 1

| Animals Distribution Per Group | | | Number of Experimental Animals in Each Group | Animal Wise Recovered after Treatment | Percentage of Recovery |
|--------------------------------|-------|--------|--|---------------------------------------|------------------------|
| Group | Type | Sex | | | |
| A | Adult | Male | 2 | 1 | 87.5% |
| | | Female | 2 | 2 | |
| | Kid | Male | 2 | 2 | |
| | | Female | 2 | 2 | |
| B | Adult | Male | 2 | - | 62.5% |
| | | Female | 2 | 2 | |
| | Kid | Male | 2 | 1 | |
| | | Female | 2 | 2 | |
| C | Adult | Male | 2 | - | 25% |
| | | Female | 2 | - | |
| | Kid | Male | 2 | - | |
| | | Female | 2 | 2 | |
| D (control) | Adult | Male | 2 | - | |
| | | Female | 2 | - | |
| | Kid | Male | 2 | - | |
| | | Female | 2 | - | |

Parasitological Findings

At the pretreatment phase on day 0, live mites (adult mites, egg etc.) were recovered from all animals. On day 15, 3 cases presented live mites in the group “A”, whereas all members of group “B”, “C”, “D” found to be positive for live mites. On day 45 no live mites were recovered from group “A” “B”, “C”, but in group “D” 2 animals were found to be positive for live mites.

DISCUSSIONS

The work was carried out with the objective, to find out a suitable control measure against the sarcoptic mange, which is very common during winter to mid summer season in Goat Research station Burnihat (One of the Goat Meat research centre of India) and its adjoining areas.

The present studies was showed that Ivermectin injections along with topical application of allopathic product (Cymethrin) gives better and earlier result than the herbal products, but herbal topical application can be an alternatives in scarcity/unavailability condition, when appropriate measures are not available. This study also indicate the female animals are shows better response to treatment (topical application), this might be due to the physio-chemical property of the animals. During the study period we have found that two herbal molecule (*Neem* extract (*Azadirachta indica*) and tobacco extract (*Nicotiana spp*)) efficiently worked on sarcoptic mange. Further these molecules may be employed in other skin problems of animals.

CONCLUSIONS

Considering the economic status and market availability of drugs, this finding may be helpful to the poor/poorest group of farmer to mitigate this type of problems in scarcity/unavailability period of medicine.

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